

## **THE WASTE-REDUCING POTENTIAL OF ADDITIVE MANUFACTURING**

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Nowadays, the urgent task of modern production technologies is the disposal of by-products after their processing. Some studies show that mechanical processing by the removal method leads to a loss of up to 90% of the starting material. By replacing traditional processing methods with additive technologies, we can reduce this value many times. In terms of environmental safety, additive technologies are many times superior to traditional ones. Their essence lies in the fact that they gradually create products from materials in accordance with the original model. An important point: in this way, this process allows you to form products with initially specified requirements without further processing. Technological progress contributes to the production of many useful things for everyday life, human health and safety. For example, additive technologies in the aircraft industry help to create more economical and lightweight air transport, while maintaining its aerodynamic properties in full. This became possible as a result of the application of the principles of the structure of bird wing bones in the design of aircraft wings. This method allows not only to save on materials, but also to create more complex shapes and products that are unattainable by traditional methods. If we used these technologies everywhere, we would be able to optimize the product lifecycle and reduce waste many times over [1].

Despite all this great potential, there are a number of problems that make it impossible for us to use this technology everywhere. Even if we use these innovative 3D printing technologies, the parts will still require additional grinding, milling or polishing. This is a big disadvantage, because it is an additional expense, and it can also form secondary waste. The use of these processes is particularly high, especially when working with metals. All industrial methods of additive manufacturing consume large amounts of electricity, and this may cast doubt on environmental

friendliness in regions with low amounts of energy. But if you start using solar panels to use additive equipment, it can make this technology a leader everywhere [2].

One of the main obstacles to using this technology remains the lack of standards and uniform requirements for the quality of materials and printing parameters, which creates legal uncertainty for manufacturers in this field. This problem is particularly acute in the construction industry, as the heterogeneous safety standards for 3D printing of concrete structures strongly hinder the implementation of this technology.

So far, AT cannot be compared with traditional production methods without unified methods for calculating the carbon footprint and material utilization factors. This factor greatly slows down decision-making at the state level on the introduction of new technology in broader areas of activity and scares off investors. If we get rid of all the existing technological problems that prevent us from using this method everywhere, the method will become a leading one. To date, we are not talking about a complete transition to additive technologies, as long as they are able to effectively complement classical processes or replace them at a certain stage of the cycle. Nevertheless, in the near future, additive manufacturing will become an integral part of technological processes in many enterprises and various fields [2].

This opens up a lot of possibilities, such as using materials that at first glance seem unsuitable for these tasks. This can radically change the lives of many people, the destinies of countries, and provide an opportunity to learn more and explore. All of humanity is highly dependent on the development of this industry. By harnessing this technology completely, we will be able to discover more new technologies and develop at a faster rate. Using it properly will help us not only progress and develop, but also save the planet's ecosystem by reducing the amount of waste.

## References

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